METHOD AND APPARATUS FOR ADJUSTING HEIGHT OF KEYBOARD

TECHNICAL FIELD

The invention relates generally to the field of computers, and more particularly to a computing system including a computer and a keyboard that is adjustable to prevent discomfort with extended use.

BACKGROUND

A great majority of computing systems on the market today come with a computer and a separate keyboard which is connected to the computer. It is generally believed that extended use of the keyboard can be uncomfortable due to repetitive motions.

"Ergonomic" keyboards have been introduced to the market that attempt to solve this discomfort, including designs that allow the user to set the keyboard up into a more "neutral" posture, that is, a posture that adapts to various parts of the body, including wrists, forearms and shoulders. These type of designs permit the adjustment of height for wrist, forearm and shoulder extension/flexion, slope for wrist extension/flexion, tenting for wrist pronation/supination, and/or splay for ulnar/radial deviation (wrist).

However, although these keyboard designs allow the user to customize the specific position of the keyboard, the position, once set, still subjects the user to prolonged discomfort.

Therefore what is need is a computer having a keyboard that is adjustable but is not subject to prolonged discomfort.

SUMMARY

Accordingly, an embodiment of the present invention is directed to a computing system having a keyboard and one or more support members connected to a lower portion of the keyboard. The height of each support member is varied in accordance with a predetermined timed sequence to vary the height of the housing portion accordingly without requiring the user to make constant mechanical adjustments to the keyboard. Each of the adjustments would slowly change over a relative long period of time to the extent that they would not be noticed by the user during use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric view of an embodiment of the computing system according to an embodiment of the present invention.

FIG. **2** and FIG. **3** is a side view and a front view, respectively, of the keyboard of FIG. **1**, showing different positions of the keyboard.

FIG. **4** is an isometric view of the bottom of the keyboard of FIGS. **2** and **3**, depicting four actuators for tilting the keyboard, along with a schematic representation of a control circuit for the actuators.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** of the drawings depict the computing system of the present invention which includes a computer **10** which can be in the form of desktop computer or a tower computer. The computer **10** includes a chassis **12** (shown in phantom lines) in which a motherboard **14** is mounted. A processor **16**, a plurality of memory modules **18**, and two input/output (I/O) devices **20** are mounted on the motherboard **14**. Two buses

22*a* and **22***b* are also provided on the motherboard **14** that connect the processor **16** to the memory modules **18** and to the input/output devices **20**, respectively. A power supply **24** is connected to the motherboard **16** and a pair of cable assemblies **26***a* and **26***b* connect the motherboard **14** to a disk drive unit **28***a* and a hard drive unit **28***b*, respectively. It is understood that other components, electrical traces, electrical circuits and related devices (not shown) are provided in the chassis **10**. Since these are all conventional, they will not be described in any further detail.

A keyboard **30** is provided and is connected to one of the input/output devices **20** by a cable **33**. The keyboard **30** includes a housing **32** having a front end **32***a*, a rear end **32***b*, and two sides **32***c* and **32***d*. A plurality of keys **34** are provided on the upper surface of the housing **32** for inputting data into the computer **10** where it is received by the one I/O device **20**, it being understood that the housing **32** contains proper conventional electrical circuits and components to permit this.

FIGS. **2** and **3** depict the various positions that the housing **32** can take according to an embodiment of the present invention. With reference to FIG. **2**, a starting or "normal" position of the housing **32** is shown in solid lines. This position can be set at the factory or by the user in a manner to be described. According to an embodiment of the present invention, the front end **322** can be raised and lowered to and from the normal position, as shown, for example, by the phantom lines. Similarly, the rear end **32***b* of the housing can be raised and lowered to and from its normal position, as also shown by example by the phantom lines. As shown in FIG. **3**, the side ends **32***c* and **32***d* can be raised and lowered to and from their normal positions, also shown, for example, by the phantom lines. It is understood that the front end **32***a*, the rear end **32***b*, and the sides **32***c* and **32***d* can each be lowered and raised independently from each other, and that the positions of the housing shown by the phantom lines are for the purposes of example only and are infinitely variable within a predetermined range, as will be described.

As better shown in FIG. **4**, four actuators **36**, **38**, **40** and **42** are mounted to the bottom of the housing **32** near the four corners thereof in any known manner. The actuators **36–42** are of a conventional design and, as such, include motors **36***a*–**42***a*, internally threaded screw jacks **36***b*–**42***b* and externally threaded shafts **36***c*–**42***c*, respectively. Referring to the actuator **36** for the purposes of example, at least a portion of the threaded shaft **36***c* is disposed in the screw jack **36***b* in threaded engagement therewith. The design is such that, upon actuation of the motor **36***a*, the screw jack **36***b* rotates, causing corresponding axial movement of the shaft **36***c* in an upward or downward direction as viewed in FIG. **4**, depending on the direction of rotation of the motor **36***a* and the screw jack **36***b*. The actuators **38–42** are identical to the actuator **36** and, since the actuators **36–42** are conventional, they will not be described in any further detail.

The actuators **38–42** are mounted relative to the bottom wall, or base, of the keyboard housing **32** in a conventional manner so that the shafts **36***c*–**42***c* extend perpendicular to the bottom wall and, as such, form support members, or "feet", for the housing **32**. When the keyboard **30** is placed on a flat work surface in the general position shown in FIGS. **2** and **3**, the shafts **36***c*–**42***c* support the keyboard **30** in an elevated position from the work surface. Upon actuation of each actuator **36–42**, a corresponding corner of the housing **32** can be raised and lowered independently of the others to one of an infinitely variable number of positions between a fully retracted and a fully extended position of the shafts **36***c*–**42***c*.